ENVIRONMENTAL JUSTICE PLAN

National Aeronautics and Space Administration

John H. Glenn Research Center
Environmental Management Office

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ACRONYMS AND ABBREVIATIONS

AOCs	Areas of Concern
AP/EPP	Affirmative Procurement/ Environmentally Preferred Products (AP/EPP)
CAAA	Clean Air Act Amendments
CECOMS	Cuyahoga Emergency Communications Systems
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFC	Combined Federal Campaign
CFR	Code of Federal Regulations
CHIA	Cleveland Hopkins International Airport
CMRO	Community and Media Relations Office
CRP	Community Relations Plan
CWA	Clean Water Act
CY	Calendar Year
cy	Cubic yard
dB(A)	Decibel, A-scale
EA	Environmental Assessment
ECT	Environmental Compliance Team
EIS	Environmental Impact Statement
EJ	Environmental Justice
EJIP	Environmental Justice Implementation Plan
EJP	Environmental Justice Plan
EMO	Environmental Management Office
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPP	Emergency Preparedness Plan
ERD	Environmental Resources Document
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FUDS	Formerly Used Defense Sites
GRC	Glenn Research Center (Lewis Field and Plum Brook Station)
GtG	Greening the Government
IWS	Industrial Waste Sewer
LEPC	Local Emergency Planning Committee
LF	Lewis Field
MCF	A measure equaling 1,000 cubic feet
NACA	National Advisory Committee for Aeronautics
NAICS	North American Industry Classification System
NASA	National Aeronautics and Space Administration
NEORSD	Northeast Ohio Regional Sewer District
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System

OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration or Act
P2	Pollution Prevention
PA	Preliminary Assessment
PBMO	Plum Brook Management Office
PBOW	Plum Brook Ordnance Works
PBS	Plum Brook Station
PCB	Polychlorinated Biphenyls
PPA	Pollution Prevention Act
PPOA	Pollution Prevention Opportunity Assessment
PPT	Pollution Prevention Team
PTI	Permit to Install
PTO	Permit to Operate
RCRA	Resource Conservation and Recovery Act
REC	Record of Environmental Consideration
RI/FS	Remedial Investigation/Feasibility Study
SAIC	Science Applications International Inc.
SWMUs	Solid Waste Management Units
SWP3	Storm Water Pollution Prevention Plan
TNT	Trinitrotoluene
TSCA	Toxic Substances Control Act
USACOE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VSI	Visual Site Inspection
WMT	Waste Management Team

EXECUTIVE SUMMARY

The Glenn Research Center (GRC) Environmental Justice Plan (EJP) characterizes the actual and potential offsite environmental impacts of GRC activities on minority and low-income populations. Both GRC locations, Lewis Field (LF) in Cleveland, Ohio and Plum Brook Station (PBS) in Sandusky, Ohio are addressed in the plan. The plan describes methods that are used to identify and mitigate possible future, or currently latent, environmental justice issues related to GRC operations. In accordance with the National Aeronautics and Space Administration (NASA) Environmental Justice Strategy, each Center must regularly evaluate and update environmental justice analyses; incorporate environmental justice concerns into other environmental analyses; and communicate with surrounding minority and low-income populations.

The findings of this EJP indicate no evidence of substantial offsite adverse impacts to human health or the environment resulting from present or reasonably foreseeable GRC operations. Further, the analyses found that no minority or low-income populations are, or are likely to be, disproportionately impacted as a result of operations at either site.

1.0 INTRODUCTION AND DEFINITIONS

1.1 Introduction

- History of Glenn Research Center

The John H. Glenn Research Center was established in Cleveland, Ohio in 1941 as the Aircraft Engine Research Laboratory of the National Advisory Committee for Aeronautics (NACA). In 1958, NACA was reorganized into NASA and the Laboratory became part of the new organization, at the time called Lewis Research Center. On March 1, 1999, the Lewis Research Center was officially renamed the John H. Glenn Research Center (GRC) at Lewis Field. The Plum Brook Station (PBS) in Erie County is operated as a satellite facility (component installation) of the Glenn Research Center.

On-site technical and support facilities have changed continuously throughout the years and the campuslike setting now includes a diverse array of laboratories, office buildings, research and test stations, and support facilities.

At Lewis Field, NASA owns or leases 147 hectares (364 acres). The site is located in western Cuyahoga County and is predominantly within the limits of the City of Brook Park, approximately twenty miles southwest of downtown Cleveland. A small part of the site to the north is located in the City of Fairview Park. The site borders the Cleveland Hopkins International Airport to the east. To the north and west is the Rocky River Reservation, a part of the Cleveland Metropolitan Park District (Metroparks). The southern boundary of the site is adjacent to residential and business districts of the City of Brook Park, including the Aerospace Technology Park office complex.

- History of Plum Brook Station

Use of the Plum Brook site by the Federal Government began in 1941 when the U.S. Army established the Plum Brook Ordnance Works (PBOW) for the manufacture of munitions. Munitions production took place from 1941 to 1945, after which buildings and production lines were decontaminated and decommissioned. There were then several changes in ownership with the eventual transfer of portions of the site to NACA (later NASA) in 1955. To develop PBS in 1958, NASA gained ownership of approximately one-third of the PBOW. PBOW consisted of 3,646 hectares (9,009 acres) inland, 0.5 hectares (1.35 acres) for 2 pumping stations on Lake Erie, and approximately 700 buildings. Between 1958 and 1960, NASA demolished hundreds of buildings, renovated approximately 41 buildings, and utilized 99 magazines (ordnance storage facilities). Currently only four facilities are capable of performing research. NASA currently occupies 2590 hectares (6400 acres) at this site.

1.2 Environmental Justice Authority

1.2.1 Regulations

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, promulgated in February 1994, requires federal agencies to undertake a number of actions to address environmental justice issues affecting minority and low-income populations. Environmental justice means the fair treatment of people of all races, cultures, and income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups should bear a

disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies (EPA, 1998). Environmental justice issues relate to a broad range of factors that tend to place disproportionately high adverse human health and environmental impacts on minority (including Native American) and low-income populations, particularly with regard to air and water pollution and exposure to hazardous wastes, substances, and materials.

The EO required the development of federal agency environmental justice strategies. Under the *NASA Environmental Justice Strategy* each NASA Center is required to develop and implement an Environmental Justice Plan (EJP). In response to the EO, GRC developed an *Environmental Justice Implementation Plan* (Jones, April 1996) and a *Supplement to the Environmental Justice Implementation Plan* (SAIC, October 1997). Five census tracts were identified within an 8 kilometer (5 mile) "region of influence" of Lewis Field, and six census tracts were identified within an 8 kilometer (5 mile) "region of influence" of PBS, which were likely to meet Federal environmental justice criteria for minority or low-income communities. The Plans concluded that "...no substantial or disproportionate environmental impacts are currently experienced by any community at either location."

1.2.2 Responsible Organization

At GRC the Environmental Management Office (EMO) is responsible for development and implementation of GRC's Environmental Justice Plan. The EMO is a part of the Safety and Assurance Directorate, whose director reports directly to the Center Director. The purpose of this EJP is to comply with the requirements of the Executive Order and the *NASA Environmental Justice Strategy*, to ensure that minority and low-income populations in the vicinity of the Lewis Field and the Plum Brook Station are not disproportionately adversely affected by any substantial environmental impacts outside the facility boundaries, to ensure that public outreach programs of the two facilities include such populations, and to integrate the environmental justice requirements of the Executive Order into the GRC's National Environmental Policy Act (NEPA) processes and other environmental analysis and compliance programs. This EJP is an update and consolidation of the original plans.

1.2.3 Plan Organization

In order to accomplish the goals set out above, this Plan is organized to correspond with Section J of the *NASA Environmental Justice Strategy* and accordingly contains a section corresponding to each of the ten elements contained therein, as well as a final section pertaining to metrics. The ten elements are:

1. Identify existing activities and programs that may have a substantial environmental effect beyond the Center's boundaries.
2. Determine the nature, level, and geographic distribution of substantial environmental impacts caused by Center activities and programs.
3. Identify minority populations and/or low-income populations that may be adversely affected by the Center's impact on the environment.
4. Identify environmental impacts on these low-income populations and/or minority populations as a result of the Center's activities.
5. Determine which existing activities and programs have a disproportionately high and adverse human health or environmental effects on minority populations and/or low-income populations.
6. Develop prudent measures for eliminating or mitigating, to the extent practicable, the disproportionately high and adverse human health or environmental effects on such populations of existing activities.

7. While developing the measures to eliminate or mitigate existing EJ concerns, communicate the situation to the affected populations and seek their input.
8. Adapt each Center's NEPA process to ensure that, when required by NEPA, EJ concerns are addressed in each Environmental Assessment (EA) and Environmental Impact Statement (EIS), prepared for proposed new projects, programs, and activities. Where the Center determines that the proposal has no EJ implications, the basis for that finding will be presented. The Center will communicate in a timely manner with potentially affected populations.
9. Communicate identified problem areas to affected communities and develop a corrective action plan for implementation which reduces/eliminates adverse effects. Hold public information meetings with community leaders and the general public to gain stakeholder feedback.
10. Assess the effectiveness of emergency response plans and the adequacy of resources to protect minority populations and/or low-income populations.

The Strategy elements establish a basic methodology for activities and programs that may have a substantial environmental effect beyond the Center's boundaries, which are considered in this plan include:

- Actions Potentially Affecting Air Quality,
- Actions Potentially Affecting Water Quality (surface and groundwater),
- Actions Potentially Affecting Noise Levels,
- Actions Potentially Affecting Offsite Biotic Resources,
- Actions Potentially Affecting Floodplains and Offsite Wetlands,
- Actions Potentially Affecting Offsite Solid and Hazardous Waste Distribution,
- Actions Potentially Affecting Historical, Archaeological, and Cultural Resources,
- Social and Economic Activity, and
- Nearby Federal and Other Activities with Potential Cumulative Environmental Impacts.

Most elements of this plan have already been implemented.

1.3 Definitions

This plan utilizes the definitions provided by the Council on Environmental Quality (CEQ) in its publication *ENVIRONMENTAL JUSTICE Guidance under the National Environmental Policy Act* (CEQ 1997). The Guidance provided the following definitions, which are adhered to in this plan.

- ***Low-income population***: Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

- ***Minority:*** Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

- ***Minority population***: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general

population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native American), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds.

- ***Disproportionately high and adverse human health effects***: When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
    1. Whether the health effects, which may be measured in risks and rates, are significant (as defined by NEPA), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death; and
    2. Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as defined by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and
    3. Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

- ***Disproportionately high and adverse environmental effects***: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

    1. Whether there is or will be an impact on the natural or physical environment that significantly (as defined by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and
    2. Whether environmental effects are significant (as defined by NEPA) and are or may be having an adverse impact on minority populations, low income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and
    3. Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

2.0 IDENTIFICATION OF EXISTING ACTIVITIES AND PROGRAMS THAT MAY HAVE A SUBSTANTIAL ENVIRONMENTAL IMPACT BEYOND THE CENTER'S BOUNDARIES

2.1 Lewis Field (normal operations and accidents)

2.1.1 LF Actions Potentially Affecting Air Quality

- Stationary Sources

Lewis Field has an assigned Ohio EPA air program facility identification number, 1318001169. The North American Industry Classification System (NAICS) code is 927110, Space Research and Technology. Stationary on-site emission sources include boilers, heaters, research test cells, and many additional insignificant and trivial sources. The boilers housed in the steam plant represent the largest actual emission source at Lewis Field. The various research combustion sources represent the largest potential emission sources at Lewis Field.

The Lewis Field facility is classified as a minor source under Title III and a major source under Title V of the Clean Air Act Amendments (CAAA). Accordingly, Lewis Field prepared a Title V permit application using the Ohio EPA-mandated STARship computer software. This application was submitted to the regulatory authorities on September 24, 1996. Since that date the Center has operated and continues to maintain its operations under a Permit Shield. This Permit Shield covers the Center until the final Title V Operating Permit can be issued. As of this writing, the permit application has undergone regulatory review and draft Title V Operating Permits have been issued. After a Title V Operating Permit is issued it must be renewed at least once every five years. As of this writing, Lewis Field has no applicable National Emission Standards for Hazardous Air Pollutants regulations. There are also no listed toxic, flammable or explosive substances in excess of the threshold quantities requiring a Risk Management Plan.

The electronic Title V Operating Permit application includes all sources classified as "non-insignificant" and “insignificant”. A third classification of “trivial” sources need not be included in the Title V Operating Permit application. Emissions from these sources result from the combustion of fuels including natural gas, #2 fuel oil, and jet fuels. Estimated actual emissions, based on the Emission Fee Report for 2003, are: 1 ton of particulates, 0.4 tons of sulfur dioxide, 28 tons of nitrogen oxides, 1.4 tons of organic compounds, and 8.9 tons of carbon monoxide annually.

The discrepancy between Lewis Field’s theoretically high potential to emit and the relatively low actual annual emissions is a result of the nature of research. In this industrial classification analytical data or “research” is the product. There is very little need to mass produce research data. Since each experiment is configured individually the equipment cannot operate 8760 potential hours per year. In general, at Lewis Field the areas with the highest potential to emit take the longest to prepare to operate. In some cases the preparation time may take six months with the projects being planned years in advance. This type of physical limitation is difficult to quantify for permitting applications, therefore these units are often addressed as being capable of operating continuously or are assigned special enforceable limitations.

As of this writing, Cuyahoga County is designated as an attainment area, though changing conditions and regulations may influence this designation in the future.

There is no evidence that the accidental failure of any system at LF would produce significant offsite impacts on air quality.

- Mobile and Off-Site Sources

On-site vehicles are classified as mobile sources of emissions. Lewis Field vehicles include construction and other heavy vehicles, aircraft, shuttle buses and fleet vehicles owned or operated by Lewis Field.

Many of the vehicles operate on natural gas or dual fuels. A bio-diesel program is in the prototype phase at Lewis Field. Other air emissions are not generated by Lewis Field directly but are attributable to its operations. These types of emissions would include power plant emissions for Lewis Field's electrical power needs, off-site research activities and the use of private, commercial and fleet vehicles for business related transportation.

2.1.2 LF Actions Potentially Affecting Water Quality (Surface and Groundwater)

- Wastewater Discharges

Wastewater generated at Lewis Field includes sanitary, stormwater, non-contact and contact cooling, cooling tower blowdown, and miscellaneous process discharges. There are three distinct wastewater collection systems at Lewis Field: the sanitary system; the stormwater system and the Industrial Waste Sewer (IWS) system.

Sanitary discharges for the three quarters prior to July 2003 averaged 353,024,654 liters (12,466 MCF) per quarter. These discharges must meet effluent limitations specified in the Northeast Ohio Regional Sewer District (NEORSD) general sewer use ordinance. Compliance is confirmed through occasional sampling by NEORSD.

Lewis Field has had limited plating, printing, and machining operations. These waste streams have largely been eliminated through process substitution or recycling, or they are being containerized for off-site disposal.

Lewis Field obtains temporary permits from NEORSD for short-term discharges as needed. These are for such things as temporary discharges from construction activities or underground storage tank removal projects. Water quality parameters and monitoring requirements for these permits vary based upon the nature of the discharge.

Stormwater is discharged separately from sanitary wastewater. Stormwater discharges are regulated under the Lewis Field National Pollutant Discharge Elimination System (NPDES) permit from Ohio EPA, Number OH 3IO00001*FD. The current permit expires June 30, 2007 and requires monitoring at nine discharge points. Discharge monitoring reports are submitted monthly. The stormwater permit portion of the NPDES permit authorizes discharges from approximately fifty other stormwater outfalls to Abram Creek and Rocky River. Some of the larger outfalls receive stormwater from the Airport, which complicates monitoring and control of these discharges.

Lewis Field has prepared a Stormwater Pollution Prevention Plan (SAIC 1999). In October 2001, an amended stormwater application was submitted to Ohio EPA that contained data about changes to Lewis Field as a result of the expansion of the Cleveland Hopkins International Airport. A combined NPDES/Storm Water permit was issued in December 2002. Within Lewis Field's permit, is the requirement for the development of a Storm Water Pollution Prevention Plan (SWP3) for the facility within 6 months of the December 1, 2002 permit effective date. Since Lewis Field has a SWP3, a revision/update to the current plan occurred by the deadline. Additionally, the NPDES/SWP3 permit calls for implementation and compliance with the terms of the SWP3 within 12 months of the December 1 permit effective date. This requirement necessitated implementation by the December 2003 deadline.

Based on historical data, NPDES-permitted discharges from Lewis Field appear to have minimal impact

on the water quality of the Rocky River. This was confirmed by a study which found no significant differences in the biological communities upstream and downstream from the Airport (Malcolm Pirnie 1996).

The Industrial Waste Sewer (IWS) system collects and passively treats various potentially oily and process wastes from around the Center. The system includes 26 spill containment devices which trap oil and grease and remove floatables and settleable solids. The IWS is currently used primarily as a central collection system for cooling tower blowdown and some wastewater/stormwater from fueling areas and some floor drains, roof drains, and sumps. Current sewer repair projects will eliminate all but cooling tower discharges to the IWS. Although the IWS still receives some wastewater, its chief value today is as an oil spill control system and a surge area for cooling towers when they require emptying for maintenance. Flows to the IWS are accumulated in retention basins where further oil removal and settling occurs. The basins are discharged only to the sanitary sewer.

There have been several instances of inappropriate connections or broken piping which allow wastewater to travel from one system to another, such as from the sanitary system to the storm sewer system. Pollutants may thus be discharged undetected and untreated. Efforts have been made by the environmental and engineering offices to identify and eliminate these problems. All known problem have been corrected and diagnostic efforts are continuing.

Lewis Field uses alternative cooling tower water treatment chemicals which are generally non-toxic. Non-contact cooling water is generally discharged to the storm sewer system, but only if the chlorine in the water has been removed.

Based on the Center's N.P.D.E.S compliance record, offsite impacts due to wastewater discharges are not significant.

In the event of a spill, it is likely that the spill will be intercepted by the Industrial Waste System. If spilled material is detected, tank operators are trained to use the onsite spill response materials to contain the spill. Lewis Field retains a local emergency response firm to assist in responding to spills which are beyond the Center's capabilities to manage.

- Groundwater

Groundwater is not used for water supply at Lewis Field. The Phase I Remedial Investigation/Feasibility Study (R and R International, 1995) did not find evidence of groundwater contamination at the Lewis Field site. No aquifer at Lewis Field has been designated as a sole or principal drinking water source under the Safe Drinking Water Act. There are no underground injection wells at the Lewis Field site.

2.1.3 LF Actions Potentially Affecting Noise Levels

Noise generated at Lewis Field can be attributed to such sources as research operations (e.g., wind tunnels and engine test cells), transient noises such as releases from valves, NASA aircraft, construction activities, and traffic noise. Research sources such as the wind tunnels generate noise from the movement of rushing air. The central process air system in Building 64 can generate high noise levels from its compressors, exhausters, heaters, chillers, and other equipment. Recent surveys indicate that, with the exception of transient noise spikes, the highest on-lab noise levels measured near operating systems within Building 64 are in the 90-95 dB(A) range, with a maximum of 102 dB(A). Transient peaks in

noise levels may occur due to the action of relief valves, vent noise, etc. Aircraft housed in the Flight Research Building (Building 4, the hangar) can taxi directly to runways at Cleveland Hopkins International Airport. Aircraft operations can generate maximum environmental noise levels between 80 and 90 dB(A) in nearby pedestrian areas on the Lewis Field site.

Responsibility for noise issues is delegated to the Noise Exposure Management Team of the Environmental Management Office. The community noise control program focuses on resolving local noise complaints and instituting appropriate measures as needed. All complaints are addressed personally by the noise program manager. The general noise level of Lewis Field is well below the average day/night sound level of the Cleveland Hopkins International Airport. Noise levels at the Lewis Field fence line are generally below 70 dB(A), with much of this noise attributable to off-site sources. Wind tunnel noise at the fence line is less than 55 dB.

2.1.4 LF Actions Potentially Affecting Offsite Biotic Resources

Lewis Field is located in western Cuyahoga County. Cuyahoga County is built-out to its borders. Lewis Field borders the Cleveland Hopkins International Airport (CHIA) to the east. Together, the IX Center (formerly the ‘‘Cleveland Tank Plant’’), adjacent to the CHIA, and the CHIA complex occupy over two thousand acres of land. The southern boundary of Lewis Field is adjacent to residential and business districts of the City of Brook Park, including the Aerospace Technology Park office development.

To the north and west is the Rocky River Reservation, a part of the Cleveland Metropolitan Park District (Metroparks). The Rocky River Reservation, which is one of the few remaining secondary growth woodland areas in Cuyahoga County, contains unique habitats. The area is managed to protect these resources to the maximum extent possible. Portions of Abram Creek, which flow through Lewis Field, are similar to terrain located in Rocky River, and are also protected by Lewis Field.

Lewis Field is isolated from neighboring facilities by its security fences and steep cliffs. The security fences at the Center inhibits the migration of mammals. There is a cumulative effect of the built-out nature of Lewis Field and surrounding communities. The Center has no significant direct impacts on offsite biotic resources.

2.1.5 LF Actions Potentially Affecting Floodplains and Wetlands

- Floodplains

According to Flood Insurance Rate Maps (FIRMs), published by the Federal Emergency Management Agency (FEMA), floodplains at Lewis Field occur in narrow strips of lowland parallel to Abram Creek. Abram Creek fulfills the criteria for an area of special flood hazard. The Special Flood Hazard Area is defined as an area of land that would be inundated by a flood having a 1% chance of occurring in any given year. No other mapped floodplains occur on Lewis Field property. No Lewis Field facilities remain in the 100-year floodplain. There are no activities currently located in floodplains at Lewis Field. It is GRC policy to restore, preserve, and protect the natural and beneficial values provided by floodplains. In carrying out this policy, GRC avoids adverse impacts associated with the occupancy and modification of floodplains.

- Wetlands

Wetlands at Lewis Field have not been officially delineated. Accurate interpretations of jurisdictional status require site-specific field delineation. Until an official delineation occurs, Lewis Field must rely on studies which indicate the potential or probable locations of wetlands at Lewis Field. Copies of the wetland indicator maps for GRC are maintained by the Environmental Compliance Team. Reference can be made to the *Final Protected Species Management Strategy For NASA Glenn Research Center At Lewis Field And Plum Brook Station, Volume II: Plant Community Survey* (SAIC, 2002) for the probable locations of wetlands at Lewis Field. Four areas at Lewis Field were identified during the 2002 survey as probable wetlands. There are no activities currently located in wetlands at Lewis Field. It is GRC policy to restore, preserve, and protect the natural and beneficial values provided by wetlands. In carrying out this policy, GRC avoids adverse impacts associated with the occupancy and modification of wetlands. Lewis Field is not engaged in a wetlands banking program.

2.1.6 LF Actions Potentially Affecting Offsite Solid and Hazardous Waste Distribution

It is the policy of GRC to: reduce solid waste by finding and using methods of reuse and recycling for all discarded materials; comply with all Federal, state, and local regulations governing the generation, storage, shipment, and disposal of solid waste; and to conserve resources.

- Current and Projected Waste Streams

Solid wastes at Lewis Field consist primarily of: RCRA solid wastes (paper, cardboard, metal, glass, etc.), petroleum products, non-hazardous soil and others. Solid waste comprises the majority of this waste stream, generated at a rate of 1.7 metric tons (1.9 tons) per day. The solid waste is transported by a private contractor, Browning-Ferris Industries of Ohio, Inc. (BFI), to their Lorain County Landfill.

Though some 12,000 different chemicals are stored and used at the Center, most of these are in small quantities, with only oils, fuels, and cryogenics being stored in bulk. Dispersal of storage, and procedures used in management of the small-quantity chemicals at the Center is designed to result in a high unlikelihood of any accident that could result in any environmental releases of dangerous mixtures. No such accidents have occurred. Bulk-storage chemicals are managed such that even if accidental releases occur they can be contained before reaching any watercourses.

- Hazardous and Toxic Waste Management

As a requirement of our waste minimization policy, GRC's first priority is to reduce the amount of hazardous material (chemical reduction) used, second to reuse excess quantities of it, third to recycle it, and lastly to dispose of it as a hazardous waste.

Lewis Field is a large quantity generator. RCRA hazardous wastes at Lewis Field consist primarily of: contaminated soil, lead abatement debris, lab pack material and others. Hazardous waste soil comprises the greatest quantity at approximately 0.8 m^3 (1 $yd.^3$) per day. This quantity is anticipated to decline rapidly in 2004 as the South Area has been remediated or closed in place.

The Waste Management Team (WMT) manages and implements a program for managing hazardous materials and disposing of hazardous wastes. It provides documentation to the Property Disposal Officer of records of shipment for disposal of hazardous wastes and materials. It recommends to and educates the user in the proper procedures to be followed when turning in a hazardous material or disposing of hazardous waste. It also educates all staff at GRC on hazardous material and hazardous waste handling and waste reduction/minimization. The WMT coordinates the transfer of the hazardous materials and

wastes to Building 212, the Central Chemical Storage Facility, for temporary storage (90-day maximum for materials determined to be a hazardous waste) while a means of reuse, recycling or disposal is determined.

The WMT determines whether hazardous material can be reused, recycled, or needs to be disposed of as hazardous waste. It coordinates the method of disposal being used with Environmental Compliance Team (ECT). WMT arranges for a waste disposal contractor to pick up and deliver the hazardous waste to a disposal facility, as required. It reviews all supporting documentation for compliance with the provisions of Title 49 CFR, Department of Transportation, for the shipment of hazardous materials and Title 40 CFR, EPA, for the disposal of hazardous wastes.

- Pollution Prevention

Pollution prevention (P2) is the use of materials, processes, or practices that reduce or eliminate the generation of pollutants at the source. The U.S. Congress and the U.S. Environmental Protection Agency (USEPA) have identified pollution prevention as the preferred approach to environmental protection and waste management. Pollution prevention is mandated for Federal facilities by the Pollution Prevention Act of 1990 and the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986.

Both NASA and GRC have been active in the area of pollution prevention through the development and implementation of pollution prevention programs. A new Pollution Prevention Greening the Government plan was established in 2002 pursuant to Executive Order 13148, Greening the Government through Leadership in Environmental Management. Chapter 6 of the GRC Environmental Programs Manual, *Pollution Prevention and Greening the Government (GtG) Plan*, assesses current practices at Glenn with respect to purchasing, waste reduction goals, pollution prevention practices, and pollution prevention opportunities. Pollution prevention and environmental justice share the goal of reducing adverse environmental effects. Thus pollution prevention efforts are significantly embedded in this environmental justice plan.

One important element in the P2 program is the Pollution Prevention Opportunity Assessment (PPOA, March 2001). A PPOA is a project-specific systematic evaluation of a process or operation to characterize all aspects of the process or operation, define the environmental impacts of the process, associate impacts and wastes with specific unit operations, and assign related costs and liabilities to specific wastes and management practices. Alternative products, processes and operations that reduce environmental impacts, plus health and safety hazards are identified. Vendor information is included to facilitate rapid implementation of the PPOA. Considerations used to rank PPOA's for possible implementation include environmental compliance, facility mission impact, environmental benefits, ease of implementation and cost savings.

GRC policy dictates that annual, environmental objectives and targets will be established by the Safety, Health, and Environmental Board as part of the Environmental Management System (EMS) operation. The Pollution Prevention Coordinator has primary responsibility for implementing the Pollution Prevention Program. The EMS P2 projected outcomes for GRC during Fiscal Year 2004 includes:

- Identifying at least 12 pollution prevention activities
- Implementing at least 6 pollution prevention activities

The Pollution Prevention Committee serves as an advisory group for the entire P2 program. Its members

collect P2 and GtG data as needed for records, reports, and documents. They also select activities for PPOAs and request experts for assistance, as necessary. The committee recommends P2 Implementation Projects and recommends the committee members to implement them. The Pollution Prevention Committee's main goals are updated on a yearly basis.

GRC has established an affirmative procurement program for purchase of environmentally preferable materials as identified by the EPA in 40 CFR 247, Comprehensive Procurement Guideline for Products Containing Recovered Materials. GRC uses NPG 8830, NASA Procedures and Guidelines for Affirmative Procurement of Environmentally Preferable Goods and Services.

The Pollution Prevention Program is intended to continually improve and expand its focus as it grows to meet the needs of GRC and the surrounding community. The GRC *Pollution Prevention Plan* implementation strategy includes the following components:

- Defining mission and goals
- Selecting projects for evaluation
- Providing detailed technical and economic evaluations
- Obtaining funds for selected projects
- Initiating and implementing selected projects
- Providing training as needed
- Evaluating successes and failures
- Refining goals based upon lessons learned
- Publicizing results
- Expanding and programming future activities.

The Pollution Prevention Committee is responsible for tracking these metrics and reporting on progress on an annual basis.

GRC's Environmental Spill and Contingency Plan (GRC, October 2003) describes procedures for the prevention and control of oil spills, including oil spills containing Polychlorinated Biphenyls (PCB), which may enter any of the on-site sewer systems. The Plan contains sections on regulatory compliance, program responsibilities, training, spill reporting, location of response equipment, and emergency response procedures. The Plan is written as Annex Q of the GRC Emergency Preparedness Plan. It also meets the needs for RCRA and Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response regulations.

2.1.7 LF Actions Potentially Affecting Historical, Archaeological, and Cultural Resources

Two facilities at the Lewis Field, the Zero Gravity Research Center (Building 110) and the Rocket Engine Test Facility (Building 202) were placed on the National Register of Historic Places in 1985. The RETF was demolished in fall 2003 under a Memorandum of Agreement with the Advisory Council on Historic Preservation.

Fort Hill, in North Olmsted, is the nearest offsite landmark listed in the National Register of Historic Places. It is less than 0.5 km (0.3 miles) west of Lewis Field.

There are no other nationally registered landmarks within the range of influence of Lewis Field.

Lewis Field takes no actions with the potential to impact offsite historical, archaeological, and cultural resources.

2.1.8 LF Actions Potentially Affecting Social and Economic Activity

Lewis Field is located in Cuyahoga County. The year 2000 United States Census gives the population of Cuyahoga County as 1.4 million people and the Cleveland-Akron Metropolitan Statistical Area as 2.9 million people.

The GRC on-site civil servant population was 1,934 as of June, 2003 with an aggregate annual salary of $148,000,000. This includes both Lewis Field and Plum Brook Station. The contractor population was approximately 1,500 as of June, 2003. The Greater Cleveland Growth Association ranked NASA GRC as the area's 49th largest employer as of March, 2000. While this indicates that Lewis Field is an important component of the local economy, it is not a dominant driver.

Since the groundbreaking at Cleveland in 1941 for the then Aircraft Engine Research Laboratory, more than $535 million has been invested in the Center's capital plant. Estimated replacement cost is approximately $1.7 billion dollars.

2.1.9 Nearby Federal and Other Activities with Potential Cumulative Environmental Impacts

Other activities nearby to Lewis Field with potential cumulative environmental impacts include: transportation arteries around the site, the Cleveland Hopkins International Airport, Ford Motor Company, General Motors Corporation, and a shopping complex.

The only known cumulative impacts of these activities is increased traffic. The increase in traffic is offset by the main arterial roads that are adjacent and near to the facility.

2.2 Plum Brook Station (normal operations and accidents)

2.2.1 PBS Actions Potentially Affecting Air Quality

- Stationary Sources

Plum Brook Station has an assigned Ohio EPA air program facility identification number, 0322020172. The NAICS code is 927110, Space Research and Technology. Stationary on-site emission sources include boilers, heaters, research test cells, a degreaser and many additional insignificant and trivial sources. The boilers represent the largest actual emission source at Plum Brook Station. The two permitted boilers were replaced in the fall of 2003. After the installation of the replacement boilers, the annual emissions rate decreased.

As of this writing, the Plum Brook Station facility is classified as a minor source under Title III and Title V of the CAAA and is registered under the Ohio EPA Non-Title V Emission Fee (Blue Card) Program in conjunction with a Presumed Inherent Physical Limitation (the inability to discharge air pollutants in quantities that trigger Title V requirements). Accordingly, Plum Brook Station prepares and submits bi-annual actual emission reports based on actual natural gas consumption for the year. Plum Brook Station has only one applicable National Emission Standards for Hazardous Air Pollutant regulation for degreasing operations.

PBS holds the appropriate air permit for solvent degreaser operation which will be updated to an Area Source Title V Permit application when this category of permit application becomes due. In the interim, Plum Brook Station is investigating the possibility of a process modification and reclassification away from this permitting need. At this time there are no listed toxic, flammable or explosive substances in excess of the threshold quantities requiring a Risk Management Plan.

Estimated actual emissions, based on the averaged bi-annual Emission Fee Reports from 1994 to 2001, are: 0.138 metric tons (0.153 tons) of particulates, 0.011 metric tons (0.012 tons) of sulfur dioxide, 1.70 metric tons (1.873 tons) of nitrogen oxides, 0.101 metric tons (0.111 tons) of organic compounds, and 1.54 metric tons (1.696 tons) of carbon monoxide annually. The relatively low actual annual emission rates are a result of the nature of research. In this industrial classification, analytical data or "research" is the product and, as such, it is not like manufacturing or mass production. Since each experiment is configured individually, the equipment cannot operate 8,760 potential hours per year. In general the areas with the highest potential to emit take the longest to prepare to operate. In some cases the preparation time may take months with the projects being planned years in advance. These low actual emission rates allow Plum Brook Station to be granted permitting flexibility under a Presumed Inherent Physical Limitation.

Bulk storage tanks at PBS contain gasoline and diesel fuel. Building 7143 contains laboratory fume hoods used during chemical analyses of water samples. Of the internal combustion engines on site, the two largest are a 536,904 kilojoules (200 horsepower) backup pump in Building 8133 and a 1.25 megawatt electric generator set in Building 1411. Permitted open burning is practiced for vegetation control and is an additional source of emissions.

Due to its limited emissions, the PBS is not classified as a major source under the Clean Air Act Title V permitting program. PBS has applied for and received Permits to Install (PTIs) and Permits to Operate (PTOs) for various on-site air emission sources.

There is no evidence that the accidental failure of any system at PBS would produce significant offsite impacts on air quality.

- Mobile and Off-Site Sources

On-site vehicles are classified as mobile sources of emissions. Plum Brook Station vehicles include construction and other heavy vehicles and fleet vehicles. Many of the vehicles operate on natural gas or duel fuels. As of this writing, a bio-diesel program is in the prototype phase. Other air emissions are not generated by Plum Brook Station directly but are attributable to its operations. These types of emissions would include power plant emissions for PBS's electrical power needs, off-site research activities and the use of private, commercial and fleet vehicles for business related transportation.

2.2.2 PBS Actions Potentially Affecting Water Quality (surface and groundwater)

- Wastewater Discharges

Wastewater discharges at PBS include stormwater, non-contact cooling water, cooling tower and boiler blowdown, and sanitary discharges. There are currently no significant sources of process wastewater. All PBS package waste water treatment plants have been routed to the Erie County Sewage Treatment Works with the exception of the Space Power Facility wastewater treatment plant (outfall #005).

Surface discharges are authorized by NPDES Permit No. OH 2IO00002*D, effective February 1, 2002 through January 31, 2007. The permit covers nine discharge locations including two in-stream monitoring stations, one sewage treatment plant outfall, two retention ponds, three non-contact cooling water outfalls and one Underground Storage Tank (UST) remediation monitoring station. One station (#015) is reported as no flow since the discharge has been routed to the sanitary system.

Stormwater from developed areas is collected in sumps and discharged through permitted outfalls which may contain stormwater, non-contact cooling water, or a mixture of both. Other stormwater is discharged to the ground or to streams.

- Groundwater

The majority of residents of Erie County receive water from public utilities that obtain most of their water from surface water sources. Residences to the north and east of PBS are connected to city, county or rural services. Erie County's primary groundwater source is from the limestone and dolomite aquifer found in the western end of the county. This aquifer also underlies portions of PBS.

No groundwater at PBS is used for drinking water. There are no injection wells on site. Routine groundwater monitoring is not required. Groundwater investigations are being conducted by the U.S. Army Corps of Engineers (USACOE) in connection with site remediation activities such as the red water ponds. Approximately 83 monitoring wells have been installed. Ongoing groundwater investigations have found several contaminants including nitroaromatics, volatile organic compounds, semi-volatile organic compounds, and metals. This contamination will be remediated, but results to date do not indicate that immediate or emergency action is required.

2.2.3 PBS Actions Potentially Affecting Noise Levels

Sources of noise at PBS include an unpaved airstrip which accommodates light aircraft, transient noise blasts from test facilities, construction activities, and traffic noise. The Army Reserves and the Ohio Air National Guard occasionally discharge pyrotechnic devices at PBS. None of these activities is believed to be a significant source of noise impacts.

2.2.4 PBS Actions Potentially Affecting Offsite Biotic Resources

PBS is located in a rural agricultural area in west central Erie County. The nearest city is Sandusky, 5 kilometers (3 miles) to the north. The property surrounding PBS is primarily agricultural with some low density residential housing. Commercial strip development is predominant along US route 250, which runs parallel to the facility to the east.

One exception to this pattern of development is Erie Sand Barrens State Nature Preserve, a 32 acre preserve outside the southern border of PBS. The barren's main features are its remnant beach ridges supporting dry sand prairie species and wet meadows with rare plants such as Virginia meadow-beauty and twisted yellow-eyed grass. PBS is isolated from adjacent properties by its security fences.

2.2.5 PBS Actions Potentially Affecting Floodplains and Offsite Wetlands

- Floodplains

According to Flood Insurance Rate Maps (FIRM), published by the Federal Emergency Management Agency (FEMA), floodplains at PBS occur in narrow strips of lowland parallel to streams. Copies of the FIRM for PBS are maintained by the Environmental Compliance Team. The Erie County Board of Commissioners published maps of the 100 and 500 year floodplains at PBS in the early 1970's. These maps are maintained by the Environmental Compliance Team. In 1984 the Army Corps of Engineers prepared flood profile maps for the four largest streams at PBS. These maps are maintained by the Environmental Compliance Team.

No PBS facilities remain in the 100-year floodplain. There are no activities currently located in floodplains at PBS.

- Wetlands

Wetlands at PBS have not been officially delineated. Accurate interpretations of jurisdictional status require site-specific field delineation. Until an official delineation occurs, PBS must rely on studies which indicate the potential or probable locations of wetlands at PBS. Copies of the wetland indicator maps for GRC are maintained by the Environmental Compliance Team.

2.2.6 PBS Actions Potentially Affecting Offsite Solid and Hazardous Waste Distribution

- Current and Projected Waste Streams

Solid wastes at PBS consist primarily of: RCRA solid wastes (paper, cardboard, metal, glass, etc.), petroleum products, PCB contaminated waste, and others. Solid waste comprises the majority of this waste stream, generated at a rate of 0.3 m^3 (0.4 cy) per day. The solid waste is transported by a private contractor to the Erie County Landfill.

- Hazardous and Toxic Waste Management

RCRA hazardous wastes at PBS consist primarily of lab pack material, spill response waste and others. Lab pack material comprises the greatest quantity at approximately 7 kg (15 lbs.) per day.

PBS uses approximately 250 different hazardous materials including fuels, gasoline, laboratory chemicals, propellants, gases, paints and coatings, lubricants, herbicides, and heating oil. Aside from bulk materials such as fuels, most hazardous substances are used in small quantities.

The PBS has been assigned Ohio EPA RCRA identification number OH 3800015379. PBS is a classified as a large-quantity generator due to high-volume wastes from past underground storage tank removals. All areas where hazardous wastes are stored have secondary containment. No treatment or disposal takes place on site.

Several investigations of possible contamination at PBS have taken place over the years. One such study was a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Preliminary Assessment of potential locations and sources of hazardous substance contamination (SAIC, 1991). This study identified 14 operable units for which there was evidence of possible contamination. A CERCLA Site Inspection then evaluated these locations through soil, sediment, surface water, and groundwater sampling (Morrison Knudsen, 1994). The sampling and other data were used to derive a Hazard Ranking System score for the PBS site. The score for the entire study area was 7.99, less than the minimum of 28.50 typically required to be placed on the CERCLA National Priorities List. Scores for the five

individual subareas (or Project Management Units) were also less than 28.50. The Site Inspection recommended no further remedial action under CERCLA. PBS received a No Further Remedial Action Planned letter from the USEPA in October 1994.

In addition to CERCLA actions, a RCRA Facility Assessment in the form of a Preliminary Assessment/Visual Site Inspection (PA/VSI) was conducted in 1998. The PA/VSI was initiated by the 1997 Administrative Order on Consent issued by the Attorney General of Ohio to NASA regarding the Finding of No Further Action letter from the USEPA. A total of 20 Solid Waste Management Units (SWMUs) and 6 Areas of Concern (AOCs) were identified during the PA/VSI. The PA/VSI recommended that 15 of the SWMUs and the 6 AOCs be investigated further based on moderate to high release potentials.

As a result of past Army activities at PBS during the PBOW operations, the U.S. Army Corps of Engineers (USACOE) is also conducting remedial activities under the Defense Environmental Restoration Program for Formerly Used Defense Sites (FUDS). Thus far, areas of concern have been identified and prioritized based on historical information and available field data. A Site Investigation is evaluating these areas to determine their environmental significance, after which remediation will be carried out as needed. In 2002 soil remediation began at TNT Area B in accordance with the approved Remedial Investigation Plan. USACE activities at PBS are being conducted in coordination with NASA and the Ohio EPA.

There are two inactive nuclear reactors in the Plum Brook Reactor Facility (PBRF), the Research Reactor (a 60 MW pressurized reactor) and the Mock-Up Reactor (a 100 kW swimming pool type reactor). The reactors ran from 1961 to 1973, and were then defueled and placed in dry storage until 2002, when the NRC approved NASA's Decommissioning Plan. Decommissioning activities are currently underway, with the goal of achieving unrestricted release from the NRC licenses by 2007. Only trained and qualified radiation workers are allowed close enough to the source to be at risk. No member of the "general" staff, let alone the public, is at risk of any exposure from the reactor or decommissioning.

The Plum Brook Management Office manages hazardous and toxic waste at PBS with the assistance of the GRC Environmental Compliance and Waste Management Teams.

- Pollution Prevention

PBS has a Spill Prevention, Control, and Countermeasure Plan (2002). The Plan describes procedures for the prevention and control of oil spills, including PCB-containing oil spills, and specifies program responsibilities, training, spill reporting, location of response equipment, and emergency response procedures. PBS is also represented on the GRC P2 Committee. PBS currently has a number of key initiatives for 2004:

- Develop a risk matrix for the PBS EMS.
- Real Time Monitoring System Installation and Testing at Plum Brook
- Implement Affirmative Procurement/ Environmentally Preferred Products (AP/EPP) at PBS
- Reduce chemical storage at PBS
- Set up an Affirmative Procurement/ Environmentally Preferred Products (AP/EPP) website and install it at PBS

2.2.7 Actions PBS Potentially Affecting Historical, Archaeological, and Cultural Resources

The Spacecraft Propulsion Research Facility (B-2) has been designated as a National Historic Landmark. Gray & Pape (2002) recommended that the Space Power Facility is potentially eligible for nomination to the National Register of Historic Places.

The Ohio Soldiers' And Sailors' Home, in Sandusky, is the nearest offsite landmark listed in the National Register of Historic Places. It is less than 1.7 km (1.1 miles) north of PBS.

Additionally, there are approximately 133 archaeological sites of known historical significance lying outside the Plum Brook Station fence that have been placed on the Ohio Historical Society Register. Presumably, because of the size of the facility a number of such sites exist on the Plum Brook Station grounds as well.

2.2.8 PBS Actions Potentially Affecting Social and Economic Activity

Plum Brook Station's work force consists of about 100 employees. Other government agencies have 20 to 30 personnel stationed on site. Plum Brook Station is not a significant employer in the overall Sandusky area in the same sense as the Lewis Field is in the greater Cleveland region.

2.2.9 PBS Nearby Federal and Other Activities with Potential Cumulative Environmental Impacts

Other large employers in the area include the Ford Motor Company, Delco-Chassis NDH, Imperial Clevite, Sandusky Plastics, and Sandusky Foundry and Machine. The Wagner Quarries Perkins Township site occupies 600 acres less than two miles north of PBS. There are no substantial environmental impacts caused by center activities in conjunction with nearby federal and other activities.

3.0 DETERMINATION OF THE NATURE, LEVEL, AND GEOGRAPHIC DISTRIBUTION OF SUBSTANTIAL ENVIRONMENTAL IMPACTS CAUSED BY CENTER ACTIVITIES AND PROGRAMS.

This section of the Plan analyzes the possible environmental impacts caused by the activities and programs at the Lewis Field and the Plum Brook Station to determine which impacts may be substantial outside the facilities' boundaries. The section is divided into an impact evaluation and, to the extent necessary, a determination of the geographic distribution of substantial environmental impacts outside the facilities' boundaries.

Impact evaluation was accomplished through the review of environmental documentation such as environmental impact statements (EIS) and environmental assessments (EA), environmental permits, environmental audits, emergency plans, pollution prevention plans, and other relevant documents to develop an overall evaluation of the direct and indirect environmental impacts from activities and programs at the Lewis Field and Plum Brook Station. The impact evaluation also involved interviews with representative staff at NASA Glenn Research Center and Plum Brook Station.

3.1 Lewis Field

No recent action at the Center has produced sufficient likelihood of significant environmental impacts to require an EIS. The only recent activity at the Center that has required an EA (*Repair of Sewers at the NASA Lewis Research Center*, 4/2/98) concluded that there would be no substantial impacts. There have been no substantial environmental permit violations in recent history. Thus, the likelihood of individual activities producing substantial off-site environmental impacts is quite small. Individual impacts of

various other operations at the Center are discussed separately below.

3.1.1 LF Air Quality Impacts

Review of data and information on air pollution sources at the Lewis Field indicates no reasonable likelihood of substantial off-site air quality impacts from normal operations and only moderate likelihood of substantial off-site air quality impacts from emergency operations or reasonably foreseeable accidents. While collectively operating, the air emissions sources at the Center are capable of moderately significant air emissions, these sources are never operated simultaneously and thus produce far fewer emissions than their permits allow.

Segregation of combustible or reactive materials and the implementation of emergency preparedness and spill prevention and control plans make a catastrophic air pollution accident extremely unlikely, though moderate off- site impacts would be possible in such an accident. No pattern of air quality problems, as evidenced by violations of existing air quality requirements, has been found at the Center. There is no indication that any activities at the Center will make a significant individual or cumulative impact on local air quality.

3.1.2 LF Water Quality Impacts (surface and groundwater)

- Wastewater Discharges

Review of data and information on water pollution sources at the Lewis Field indicates no reasonable likelihood of substantial off-site water quality impacts from normal operations and only moderate likelihood of substantial off-site water quality impacts from emergency operations or reasonably foreseeable accidents. The Center has generally been in compliance with its NPDES permit, with only occasional minor violations recorded; and these are being mitigated by removing connections between the sanitary and storm sewers and through improved management practices designed to keep pollutants out of the storm sewer system. Review of solid and hazardous waste programs indicates no reasonable likelihood of significant impacts to water quality from present or past actions and programs. Significant pollution events in Abram Creek and the Rocky River are unlikely given the scale of activities at the Lewis Field and its environmental compliance record.

- Groundwater

There is no reasonable likelihood of substantial off-site impacts to groundwater from normal operations or from emergency operations or reasonably foreseeable accidents such as explosions or fires.

3.1.3 LF Noise Impacts

The general noise level of the Center is well below the average day/night noise level of adjacent Cleveland Hopkins International Airport. Noise impacts off-site are qualitatively measured by noise complaints, of which there has been one in calendar year 2004. All complaints are investigated and typically found to be minor and temporary and most have a high probability of being related to airport functions.

Review of data and information on noise pollution sources at the Lewis Field indicates no reasonable likelihood of substantial sustained off-site noise impacts from normal operations and only moderate

likelihood of substantial off-site noise impacts from emergency operations or reasonably foreseeable accidents.

3.1.4 LF Biotic Resources Impacts

Review of data and information on potential impacts to biotic resources from activities at the Lewis Field indicate no reasonable likelihood of substantial off-site biotic impacts from normal operations and only moderate likelihood of substantial off-site biotic impacts from emergency operations or reasonably foreseeable accidents.

3.1.5 LF Floodplains and Wetlands Impacts

Review of data and information on potential impacts to floodplains and wetlands as a result of activities at the Lewis Field indicates no reasonable likelihood of substantial off-site floodplains and wetlands impacts from either normal operations or from emergency operations.

3.1.6 LF Solid and Hazardous Waste Impacts

All wastes at Lewis Field are managed, transported, and disposed of in compliance with Federal, state, and local laws and regulations. All wastes are disposed of in licensed landfills. Review of data and information on hazardous waste and hazardous substances sources at the Lewis Field indicates no reasonable likelihood of substantial off-site impacts from normal operations and only moderate likelihood of substantial off-site impacts from emergency operations or reasonably foreseeable accidents.

3.1.7 LF Historical, Archaeological, and Cultural Resources Impacts

No substantial off-site historical, archaeological, and cultural resources impacts are considered possible from any of the on-site activities at the Center.

3.1.8 LF Social and Economic Impacts

Operations at the Center are considered likely to remain at approximately the same nature and level for the foreseeable future. Under this scenario, substantial off-site social and economic impacts are highly unlikely.

3.1.9 LF Potential for Substantial Off-Site Cumulative Impacts

Lewis Field does not produce individual substantial impacts, as reflected by compliance with regulatory programs. Review of the potential for cumulative impacts indicates a very low potential for any significant contribution to substantial off-site cumulative environmental impacts from activities at the Center. There is no reasonable likelihood of substantial off-site cumulative impacts from normal operations and only moderate likelihood of substantial off-site cumulative impacts from emergency operations or reasonably foreseeable accidents.

3.1.10 LF Geographic Distribution Evaluation

Since no substantial off-site impacts have been identified as likely to occur, no analysis of the impacts' geographic distribution is required.

3.2 Plum Brook Station

No recent action at PBS has produced sufficient likelihood of significant environmental impacts to require an EIS. The only recent activity at PBS that has required an EA, the Plum Brook Reactor Facility Decommissioning Project, concluded there was a Finding of No Significant Impact. The EA also specifically addressed environmental justice issues, and concluded that minority populations and low-income populations are not an identifiable group within the radius of the significant impacts resulting from the operation of the Plum Brook Station. There have been no substantial environmental permit violations as evidenced by a review of compliance with the environmental permits. Thus, the likelihood of individual activities producing substantial off-site environmental impacts is quite small. Individual impacts of operations at the Center are discussed separately below in order that an evaluation of potential cumulative substantial off-site environmental impacts can be made.

3.2.1 PBS Air Quality Impacts

A review of data and information on air pollution sources at the Plum Brook Station indicates no reasonable likelihood of substantial off-site air quality impacts from normal operations and only moderate likelihood of substantial off-site air quality impacts from emergency operations or reasonably foreseeable accidents. While collectively operating the air emissions sources at the Station are capable of moderately significant air emissions, these sources are never operated simultaneously and thus produce far fewer emissions than their permits allow. No pattern of air quality problems, exhibited through violations of existing air quality requirements, has been found at the Station.

3.2.2 PBS Water Quality Impacts (surface and groundwater)

- Wastewater

Review of data and information on water pollution sources at the Plum Brook Station indicates no reasonable likelihood of substantial off-site water quality impacts from normal operations, emergency operations, or reasonably foreseeable accidents. The Station has recently experienced minor compliance problems with its NPDES permit, but the primary cause of these problems has been corrected. Review of solid and hazardous waste programs indicates no reasonable likelihood of significant impacts to water quality from present actions and programs and only moderate impacts to water quality from the earlier munitions manufacturing activities at the Station. Significant pollution events in surface waters are unlikely given the scale of activities at the Station and its environmental compliance record.

- Groundwater

There is no reasonable likelihood of substantial off-site impacts to groundwater from normal operations or from emergency operations or reasonably foreseeable accidents such as explosions or fires.

3.2.3 PBS Noise Impacts

Off-site noise impacts from the Station are not significant and are further attenuated by long distances from sources to receptors. Review of data and information on noise pollution sources at the Plum Brook Station indicates no reasonable likelihood of substantial sustained off-site noise impacts from normal operations and only moderate likelihood of substantial off-site noise impacts from emergency operations or reasonably foreseeable accidents such as explosions or fires. No noise complaints have been registered

against any operations at PBS during calendar year 2003.

3.2.4 PBS Biotic Resources Impacts

PBS is surrounded by an eight foot high chain link fence, which virtually prohibits the migration of larger animals into or out of the facility. There is no evidence that local offsite animal populations have been significantly impacted by the barrier that PBS represents.

Controlled field burns at PBS have never extended beyond the fenceline.

Review of data and information on potential impacts to biotic resources from activities at the Plum Brook Station indicates that, as a result of the large size of the Station and the relatively low intensity of operations, there is no reasonable likelihood of substantial off-site biotic impacts from normal operations and only moderate likelihood of substantial off-site biotic impacts from emergency operations or reasonably foreseeable accidents.

3.2.5 PBS Floodplains and Wetlands Impacts

Review of data and information on potential impacts to floodplains and wetlands as a result of activities at the Plum Brook Station indicates no reasonable likelihood of substantial off-site floodplains and wetlands impacts from either normal operations or from emergency operations.

3.2.6 PBS Solid and Hazardous Waste Impacts

The Station is a generator of solid and hazardous wastes. All areas where hazardous wastes are stored have secondary containment and no substantial RCRA violations have been reported. Closure operations for three USTs have been completed and additional closure plans are being reviewed by Ohio Environmental Protection Agency (OEPA). A CERCLA site inspection of conditions at the PBOW red water ponds and burn pit has been prepared and reviewed by the federal EPA and OEPA. EPA has issued a "No Further Remedial Action Planned" letter to NASA based upon the CERCLA site investigation.

Review of data and information on hazardous waste and hazardous substances sources at the Plum Brook Station indicates no reasonable likelihood of substantial off-site impacts from normal operations and only moderate likelihood of substantial off-site impacts from emergency operations or reasonably foreseeable accidents.

3.2.7 PBS Historical, Archaeological, and Cultural Resources Impacts

No substantial off-site historical, archaeological, and cultural resources impacts are considered possible from any of the on-site activities at the Station. The Station's large physical size, the scale of operations, and resulting large amount of buffering provided all on-site activities, render any such impacts highly unlikely.

3.2.8 PBS Social and Economic Impacts

The PBS is not as significant an employer in its region as is the Lewis Field site. NASA’s presence in the area provides local economic impacts and benefits.

Operations at the Station are considered likely to remain at approximately the same nature and level for

the foreseeable future. Under this scenario, substantial off-site social and economic impacts are highly unlikely. Because of the small on-site work force, a scale-down of operations would have little off-site impact. A large increase in activities at the Station is the only circumstance where significant social and economic impacts might be produced. Under present federal budgetary constraints, such an expansion is unlikely.

3.2.9 Potential for Substantial Off-Site Cumulative Impacts

The Plum Brook Station does not produce individual substantial impacts, as reflected by compliance with generally accepted pollution levels defined in applicable regulatory programs. The facility produces no cumulative substantial environmental impacts beyond its boundaries.

Review of the potential for cumulative impacts indicates a very low potential for any significant contribution to substantial off-site cumulative environmental impacts from activities at the Station. NASA operations are well buffered from activities in the Sandusky area to a great extent due to the 5 kilometer (3 mile) separation. Because of this natural buffering and the fact that present and foreseeable NASA operations are unlikely to increase in intensity, there appears to be no reasonable likelihood of substantial off-site cumulative impacts from actions and programs at PBS.

3.2.10 PBS Geographic Distribution Evaluation

No substantial off-site impacts have been identified as likely to occur. No analysis of the impacts' geographic distribution is required.

4.0 IDENTIFICATION OF MINORITY AND LOW-INCOME POPULATIONS THAT MAY BE ADVERSELY AFFECTED BY THE CENTER'S IMPACT ON THE ENVIRONMENT

This evaluation identifies minority and low-income populations that could be impacted by the activities and programs at the GRC facilities. The census units chosen for this analysis are small, relatively permanent census tracts averaging 4,000 people (ranging from fewer than 2,500 to more than 8,000 people.

Sources of demographic, geographic, and community-identification information were reviewed to determine whether or not such potentially affected populations may exist around the facilities. The only source of statistical census data used was the U.S. Census Bureau’s Census data. This data search revealed a close correlation with the conclusions of the *Environmental Justice Implementation Plan* (Jones, 1996) at both sites.

Anecdotal identification of minority and low-income populations that could be impacted by the activities and programs at the GRC facilities was confirmed by community groups that were contacted during the development of this Plan. The community groups are identified in Section 8.0 of this Plan. No other minority and low-income populations were identified in conversations with community groups.

For purposes of this analysis a "minority population" is found where the minority population percentage for a particular census tract "is meaningfully greater than the minority population in the general population" for the region of influence around the particular facility. A "low-income population" is found where the median income for a census tract is identified by the Bureau of the Census as meeting the poverty threshold. The results of the application of these minority and low-income criteria for the Lewis

Field and Plum Brook Station are discussed separately below and depicted in tables and maps at the end of each discussion.

4.1 Lewis Field

4.1.1 Minority and Low-Income Communities around the Lewis Field

The potential region of greatest influence for the Lewis Field includes the immediately surrounding communities of the City of Cleveland to the east, Brook Park to the south and west, Fairview Park to the north, and North Olmsted to the west. For evaluation purposes, the region of potential influence is also assumed to contain those portions of Cuyahoga and Lorain Counties within an 8 kilometer (5 mile) radius of the Lewis Field. This radius is considered to be more than an ample region of potential influence given the lack of significant offsite impacts.

The adjacent communities of Brook Park, Fairview Park, and North Olmsted are decidedly composed of Whites with incomes that exceed the poverty threshold (Table 4-1). The nearest census tracts which qualify as a minority populations based on the percentage of the affected area that is meaningfully greater than the minority population percentage in the county are approximately one mile from Lewis Field (Figure 4-1). Only one of these tracts, shown in yellow, qualifies based on income as well (Figure 4-2). This tract is within Cleveland's Riverside Neighborhood, and contains the Cuyahoga Metropolitan Housing Authority's Riverside Park subsidized housing complex. The other tract, which lies to the south of the Center, is shown in green. This tract lies within the City of Berea and houses 29.4 percent black population, slightly higher than the county average.

Only two other tracts display evidence of both a relatively high concentration of minorities and low income populations. These tracts are in Cleveland's Puritas-Longmead Neighborhood, greater than 5 kilometers (3 miles) from Lewis Field.

Table 4-1 Lewis Field Comparative Race and Income Statistics

Indicator	Brook Park	Fairview Park	North Olmsted	Cleveland	Cuyahoga County	Ohio
Percent white	96	97	95	43	68	85
Percent black	2	1	1	51	27	12
Percent Hispanic	2	2	1	6	3	2
Median Household Income in Dollars (1999)	46,333	50,487	52,542	25,928	39,168	40,956

The 1999 U.S. Bureau of the Census weighted average poverty threshold for four people was $17,029.

There are no known populations who principally rely on fish and/or wildlife for subsistence within the range of impacts of Lewis Field.

4.2 Plum Brook Station

4.2.1 Minority and Low-Income Communities around Plum Brook Station

Plum Brook Station is situated in a mixed agricultural and low density residential area, the nearest city being Sandusky (Figure 4-3). For evaluation purposes, the region of potential influence is also assumed to contain that portion of Erie County within an 8 kilometer (5 mile) radius of Plum Brook Station. This radius is considered to be more than an ample region of potential influence given the lack of significant offsite impacts.

The city of Sandusky, population 27,844 in 2000, is over 5 kilometers (3 miles) from the nearest point at Plum Brook Station. Within the radius of influence of Plum Brook Station, there are no other cities with populations in excess of 1000. Perkins Township, within which the majority of Plum Brook Station is situated, had a population of 12,578 in the 2000 Census. With a population density of approximately 100 people per square kilometer (260 people per square mile), Perkins Township can be classified as largely rural. The other townships adjacent to Plum Brook Station, Oxford and Milan, are very similar in their demographics.

The residents of Erie County are predominantly White, with 88 percent of its population falling into this category (Table 4-2). African-Americans are the second largest ethnic component, with 8 percent of the population. Of the African-American population, 86 percent live in the city of Sandusky. Hispanics account for 2 percent of Erie County's population.

Table 4-2 Plum Brook Station Comparative Race and Income Statistics

Indicator	City of Sandusky	Erie County	Ohio
Percent white	75	88	85
Percent black	12	8	12
Percent Hispanic	3	2	2
Median Household Income in Dollars(1999)	37,749	42,746	40,956
Poverty Status in 1999 (Percent Below Poverty Level)	12	6	8

The 1999 U.S. Bureau of the Census weighted average poverty threshold for four people was $17,029. While the level of poverty in Erie county is below the Ohio average (Table 4-2), the concentration of families living in poverty are high in the city of Sandusky (Figure 4-4). Perkins Township families below the poverty threshold were approximately 3 percent in 1999.

FIGURE 4-1 MAP OF MINORITY POPULATIONS IN THE LEWIS FIELD VICINITY

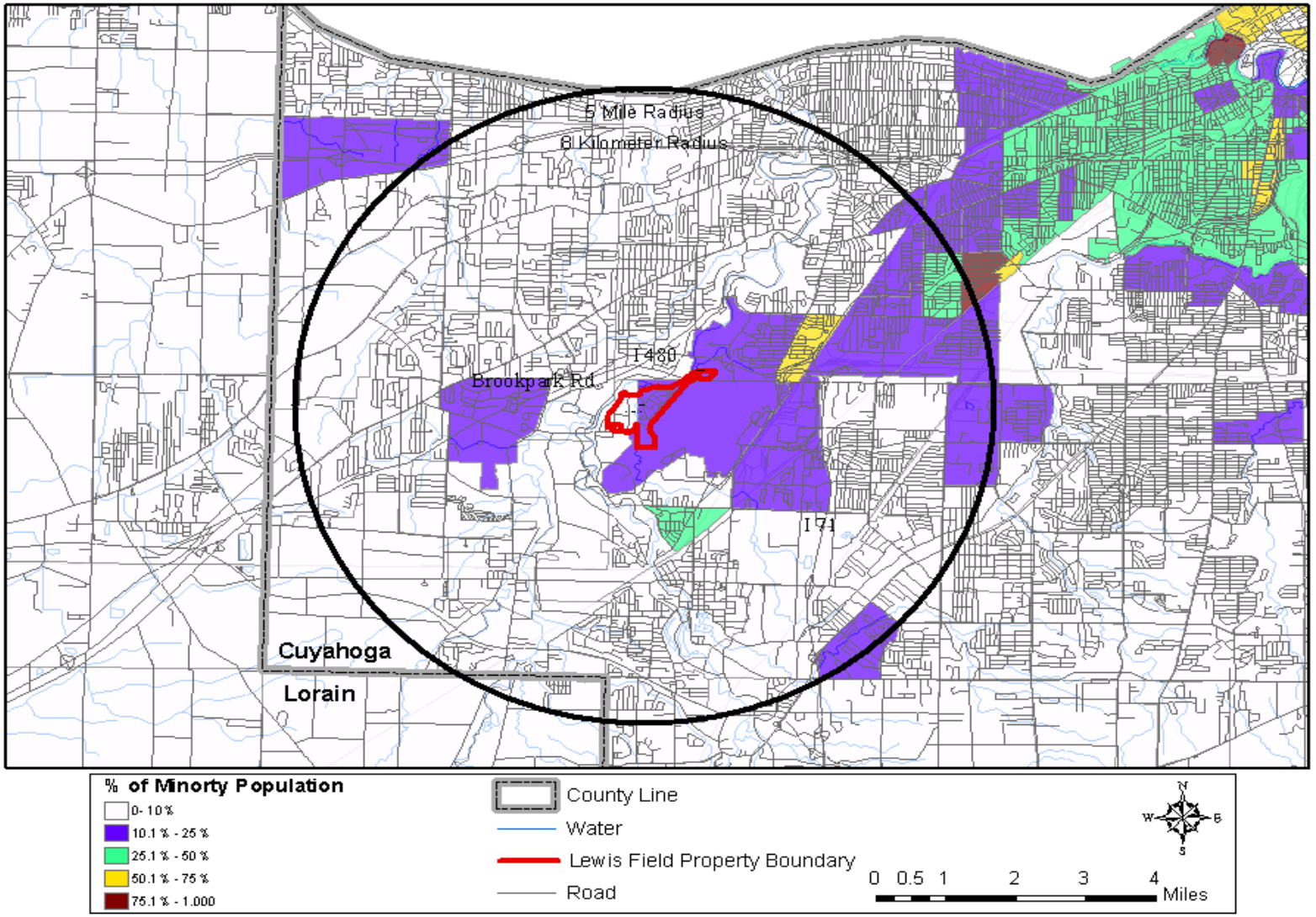


FIGURE 4-2 MAP OF HOUSEHOLDS BELOW POVERTY LEVEL IN THE LEWIS FIELD VICINITY

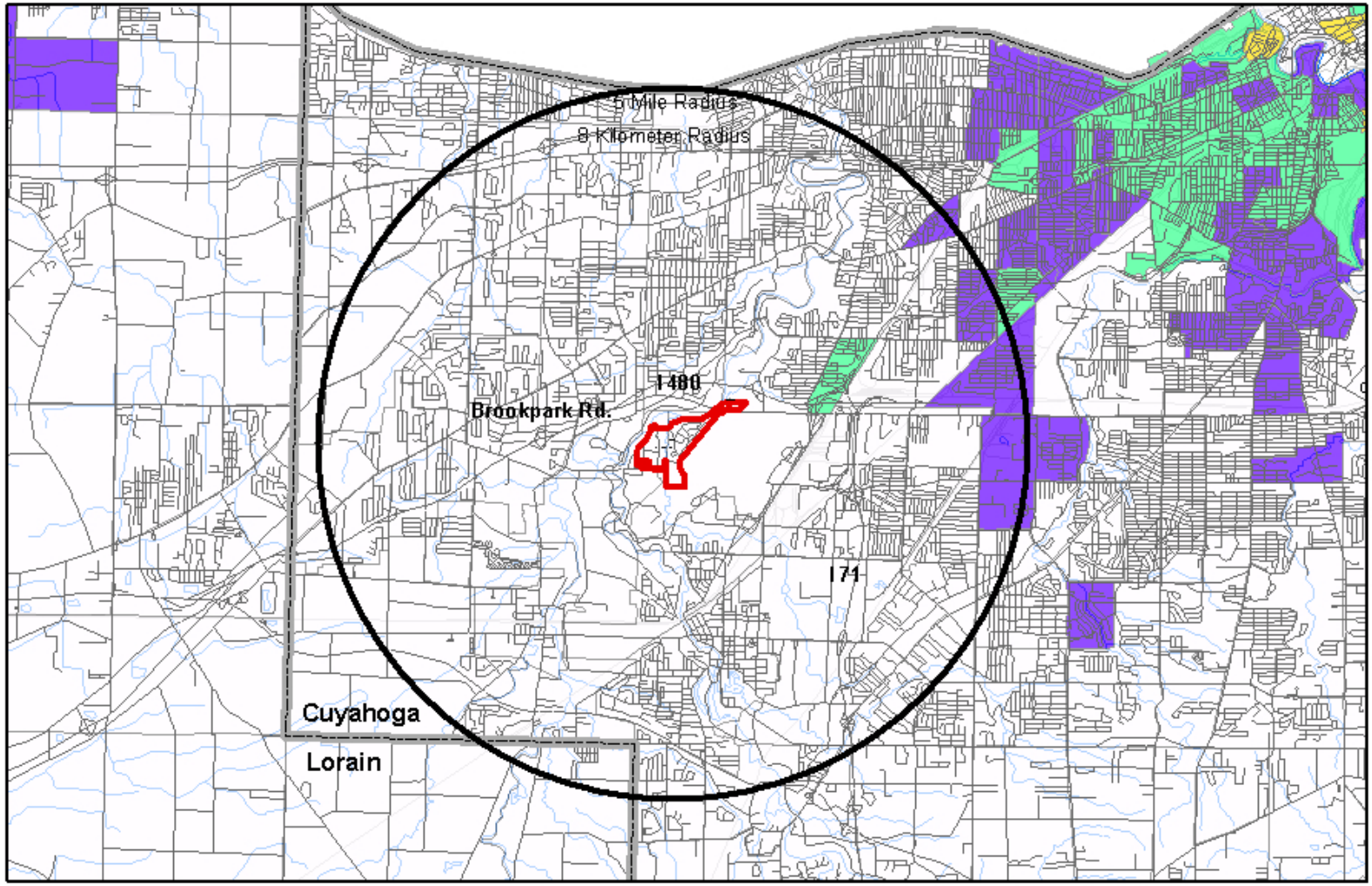
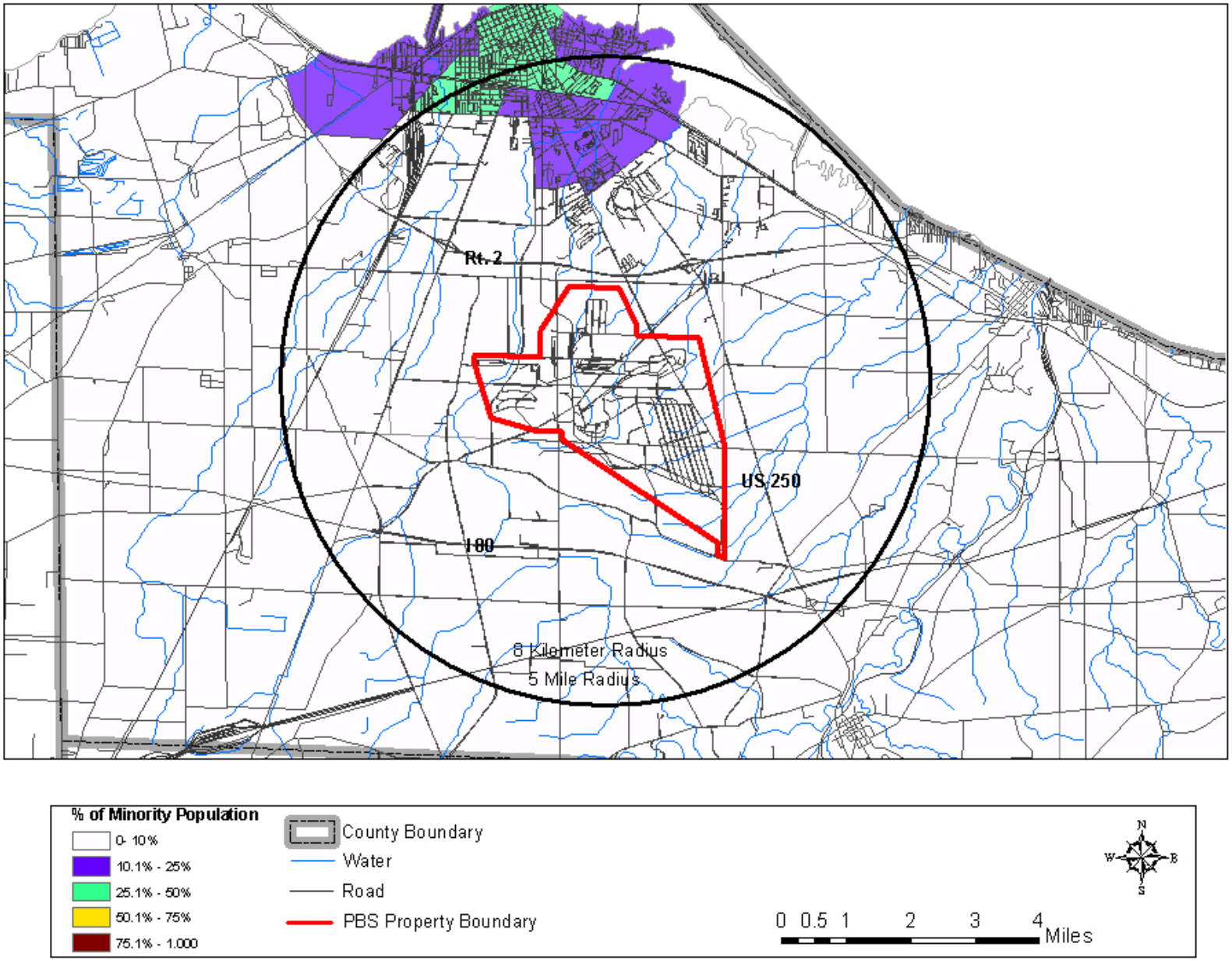


FIGURE 4-3 MAP OF MINORITY POPULATIONS IN THE PLUM BROOK STATION VICINITY



There are no known populations who principally rely on fish and/or wildlife for subsistence within the range of impacts of Plum Brook Station.

5.0 IDENTIFICATION OF WHICH ENVIRONMENTAL IMPACTS AFFECT MINORITY AND LOW INCOME POPULATIONS AS A RESULT OF THE CENTER'S ACTIVITIES AND PROGRAMS

5.1 Analysis

Empirical analysis at this time indicates no minority or low-income populations are significantly affected as a result of activities or programs at either the Lewis Field or Plum Brook Station. This situation will continue to be evaluated as newly proposed projects or activities are evaluated through the NEPA process. It is anticipated that the NEPA process will be able to continue to keep minority and low-income populations from experiencing disproportionate high and adverse impacts from GRC's activities and programs.

6.0 DETERMINATION OF EXISTING ACTIVITIES AND PROGRAMS WHICH HAVE A DISPROPORTIONATELY HIGH AND ADVERSE HUMAN HEALTH OR ENVIRONMENTAL EFFECTS ON MINORITY POPULATIONS AND/OR LOW-INCOME POPULATIONS.

6.1 Analysis

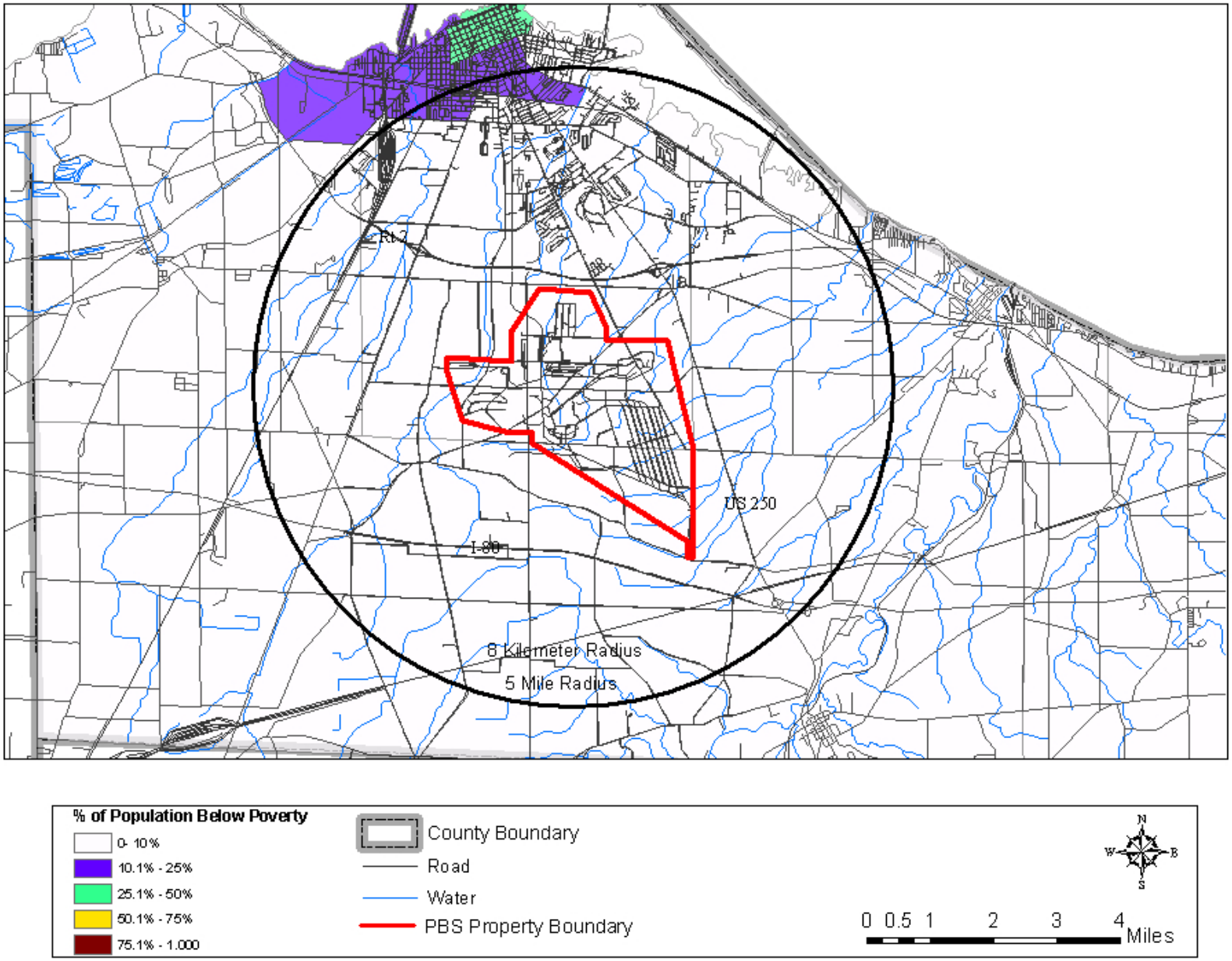
Empirical analysis at this time indicates no minority or low-income populations are significantly affected as a result of activities or programs at either the Lewis Field or Plum Brook Station. This results from the determination in Section 5.0, above, that there is no likelihood for substantial off-site impacts to the human environment or natural environment as a result of present or reasonably foreseeable activities and programs at either facility. It is anticipated that analyses and control of these activities will be able to continue to prevent minority and low-income populations from experiencing disproportionate high and adverse impacts from the Center's activities and programs.

7.0 DEVELOPMENT OF PRUDENT MEASURES FOR ELIMINATING OR MITIGATING DISPROPORTIONATELY HIGH AND ADVERSE IMPACTS ON MINORITY AND LOW-INCOME POPULATIONS

7.1 Introduction

This section of the Plan identifies current practices and suggests methods that the Center may use to identify, eliminate, or mitigate disproportionate and adverse impacts on minority and low-income populations. This section explores additions and changes to activities and programs, including: pollution prevention; improved compliance with existing laws; and eliminating or reducing community concerns.

FIGURE 4-4 MAP OF HOUSEHOLDS BELOW POVERTY LEVEL IN THE PLUM BROOK STATION VICINITY



7.2 Pollution Prevention

7.2.1 Program Status

The Pollution Prevention program at GRC has been active since 1995. Numerous pollution prevention initiatives have been instituted at GRC. Refer to Section 2.0 for details.

7.2.2 Opportunities for Enhancing Environmental Justice

The Pollution Prevention Committee has been tasked with a number of objectives in 2004 that would have direct or indirect impacts on enhancing environmental justice at GRC. Attainment of the Pollution Prevention Committee's yearly outcomes would advance GRC's compliance with Executive Order 12898.

7.3 Compliance with Existing Laws

Compliance with established environmental regulations is essential for eliminating or mitigating disproportionate and/or adverse impacts on minority and low-income populations. GRC is committed to full compliance with all Federal, State, and local environmental laws and regulations. GRC maintains a staff of engineers, scientists, and other professionals to ensure that the Center remains in compliance. This staff is located primarily in the EMO the mission of which is to "support NASA Glenn Research Center in the pursuit of its charter by ensuring that the Center provides a safe and healthful work place for its employees and operates in a manner that is protective of the community and the environment." The Plum Brook Management Office, with the support of EMO, is responsible for environmental compliance at the PBS.

In addition to its responsibilities for addressing issues of environmental justice, the EMO is responsible for GRC compliance with applicable provisions of the Pollution Prevention Act, National Environmental Policy Act, Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation and Liability Act. The EMO manages environmental permitting at GRC and provides information to the State of Ohio regarding air and water discharges, hazardous waste, and toxic chemicals stored on site. This information is available to the public through State agencies.

7.3.1 Program Status

Internal and external audits of Glenn and PBS have concluded that Glenn Research Center is in substantial compliance with Federal, State, and local environmental regulations. GRC is audited by NASA HQ on a three year cycle. GRC's environmental programs are occasionally inspected by Federal, State, county, and city officials. Additionally, the waste management program is internally audited every year. Other environmental programs are internally audited on an as needed or requested basis.

7.3.2 Opportunities for Enhancing Environmental Justice

There is no evidence suggesting that there are additional significant gains which can be made in the GRC environmental compliance program at this time with respect to environmental justice.

Upon issuing a solicitation for onsite support services, GRC may elect to incorporate requirements of EO No. 12898 into the solicitation documents. Given the nature of current and foreseen activities at GRC, this action would accomplish little towards advancing the Center's compliance with EO No. 12898. Should the NEPA analysis processes reveal the potential for non-compliance with EO No. 12898, the Center's environmental staff will coordinate with the Center Procurement Office to implement these contractor requirements.

7.4 Dealing affirmatively with community concerns

7.4 1 Program Status

Public outreach to properly communicate the true nature of environmental impacts, as part of the NEPA process, has been used on two recent occasions. In both instances there was the potential for offsite impacts due to actions taken by GRC.

As a cooperating Agency, GRC supported the Federal Aviation Administration's production of an Environmental Impact Statement (EIS, June 2000) for the Cleveland Hopkins International Airport Expansion Project. Environmental justice was actively addressed in the NEPA analysis and in the public outreach programs. No environmental justice concerns emerged.

The first instance where environmental justice was actively addressed in an Environmental Assessment under NEPA was the Decommissioning of the Plum Brook Reactor Facility (March 2001). Environmental justice was specifically addressed in the NEPA analysis and in the public outreach programs. No environmental justice concerns emerged.

7.4 1 Opportunities for Enhancing Environmental Justice

Ongoing operations at GRC do not require any additional efforts to dealing affirmatively with community concerns. In the future, where there is the potential for offsite impacts due to actions taken by GRC, the Center will deal affirmatively with community concerns through the NEPA process.

8.0 PUBLIC INVOLVEMENT IN ENVIRONMENTAL JUSTICE ISSUES

8.1 Introduction

This section of the Plan describes the most appropriate public involvement techniques, many of which have already been implemented for certain projects.

The National Aeronautics and Space Act (1958) established NASA and tasked it with providing the widest practicable and appropriate dissemination of information concerning its activities. Community involvement at GRC includes all of the programs that communicate with the outside community and solicit opinions from the community.

While GRC has no immediate or foreseen EJ concerns, it communicates with the public regarding our general operations. In situations where there was the potential for offsite impacts, GRC has contacted the affected populations and sought their input through the NEPA process.

8.2 Community Involvement

8.2.1 Ongoing Activities

GRC routinely involves the surrounding communities through various means.

The Community and Media Relations Office (CMRO) and the Educational Programs Office are located within the GRC External Programs Directorate. The CMRO communicates information about GRC capabilities and technologies within NASA and to the general public in order to increase awareness of the Center's public programs. The CMRO has two primary functions: Community Relations and Media Relations. Community Relations is responsible for public outreach programs such as the Visitors Center, traveling exhibits, and the Speakers Bureau. Media Relations is responsible for developing, planning, and coordinating the dissemination of information regarding GRC, as well as the Agency's programs and projects and its objectives through the news media locally, regionally, and nationally.

CERCLA requires that the public be informed about site-related issues. Under the terms of the Findings and Orders signed in 1996, the Ohio EPA took the lead role in disseminating information to the public about CERCLA activities at Lewis Field. The CERCLA Community Relations Plan, which actively solicits community involvement, is managed by the GRC CMRO.

The Educational Programs Office provides educational, technical, and human resource skills and resources to accomplish NASA's educational mission. This mission is organized into five areas: Teacher Preparation/Skill Enhancement, Curriculum Support, Student Support, Systemic Change, and Educational Technology. Activities involve the K-12 educational community as well as undergraduate and graduate programs. These programs provide on-site work and educational experiences and a number of outreach and partnership programs. The Educational Programs Office is actively involved in programs that educate minority and low-income families about GRC activities. Glenn has formed a community-responsive partnership with the Cleveland Municipal School District, to provide educational experiences as well as exposure to GRC professionals.

GRC's Public Affairs Home Page on the Internet provides a quick and easy access to understandable information for the general public about GRC. The page also provides links to all Web sites at GRC and to the primary Home Pages at each of the NASA Field Installations and NASA Headquarters.

The EMO is actively involved in communicating with the public. The EMO has organized an Earth Day Committee for GRC since 1993. Its purpose is to help educate and enhance the awareness of Glenn employees and the general public regarding NASA environmental activities, issues, and concerns. The Earth Day Committee staffs booths at the annual EarthFest at the Cleveland Zoo, Berea EarthFest, and other similar events.

Community involvement extends to the activities at PBS including describing and disclosing to the public any plans with the potential for significant environmental impacts as part of the NEPA process and has done so consistently.

The U.S. Army Corps of Engineers has a community relations plan for its remediation activities at PBS. In support of decommissioning the Reactor Facility at Plum Brook Station, NASA created a multi-faceted Community Relations Plan (CRP). The CRP was developed to describe mechanisms for informing and involving the public in activities and decisions relating to the decommissioning. The Plan was the result of extensive research conducted on the communities within Erie County and interviews with current and retired NASA employees, public officials, and leaders in the area's educational, environmental, business and minority communities.

NASA has established a Community Information Bank at the Bowling Green State University Firelands Library. The CIB is a repository of information on the decommissioning of the Reactor Facility at Plum Brook Station. Information on the project is continually updated and is available to the public, for review, upon request.

To date, neither Glenn nor PBS has received criticism regarding weaknesses in community involvement programs.

8.2.2 Public Input to this Plan

The following community groups and agencies have been contacted during the development of this Plan, and have been used as the basis for updating the current GRC public involvement program for environmental justice concerns. Some of these organizations declined to comment.

Catholic Coalition on Community Action, 1027 Superior Avenue, Cleveland, OH 44114, (216) 696-6525 (Executive Director, Len Calabrese)

Council for Economic Opportunities in Greater Cleveland, , Research, and Evaluation, 1228 Euclid Ave, Suite 700, Cleveland, OH 44115, (216) 696-9077 (Director of Planning, Cheryl Ross)

Environmental Health Watch, Cleveland Environmental Center, 3500 Lorain Avenue #302, Cleveland, Ohio 44113 (216) 961-4646 (Executive Director, Stuart Greenberg)

Erie County Department of Planning and Development, 2900 Columbus Avenue, Sandusky, Ohio 44870 (419)-627-7792 (Planner, Carrie Smith)

Federation for Community Planning, Rockefeller Building, 614 W. Superior Avenue, Suite 300, Cleveland, OH 44113, (216) 781-2944 (Policy and Planning Associate, Terri Lenihan)

Greater Cleveland Coalition for a Clean Environment, 1485 East 107th Street, Cleveland, OH 44106, (216) 721-6490 (Executive Director, Clarence Dunn)

National Association for the Advancement of Colored People (NAACP) Sandusky Branch Phone: Address: 1615 Pierce Street, Sandusky 44870, (419)-625-0657

Ohio Department of Natural Resources, Division of Wildlife Districts 2 and 3, 1840 Belcher Dr., Columbus, Ohio 43224-1300, (614) 265-6300 (Wildlife Research Technician, Damon Greer)
Sierra Club Northeast Ohio Group, Environmental Justice Committee, (216)-939-8229, (Committee Chair, Dennis Plank)

United Church of Christ Commission on Racial Justice, 700 Prospect Avenue, S.E., Cleveland, OH 44115, (216) 736-3722, (Minister for Environmental Justice, Carlos J. Correa)

Plum Brook Reactor Facility Decommissioning Community Workgroup, Plum Brook Station, 6100 Columbus Avenue, Sandusky, Ohio 44870, (419) 499-2667 (Committee member, engineer and safety consultant, Mark Bohne)

USEPA REGION 5, 77 West Jackson Boulevard, Chicago, IL 60604-3507 (312)-353-8894, (Office of Regional Counsel, Alan Walts)

8.3 Opportunities for Enhancing Environmental Justice

The *NASA Environmental Justice Strategy* regards public involvement as the primary focus for implementing environmental justice. GRC has provided community access to the GRC Environmental Programs Manual and GRC Environmental Resources Document through the Internet. GRC also considers environmental justice in the community affairs and impact analyses components of the NEPA process.

It is not recommended that GRC enhance public involvement in environmental justice issues at this time.

8.4 Implementing the Plan

Ongoing communications with the external community as well as communications with impacted populations under the NEPA program are evidence that GRC currently has an adequate community involvement program. There are no plans to expand the community involvement programs at Lewis Field or PBS at this time. The *EJP* will be reviewed every five years following the release of the decennial and midterm census data or revised as operations change significantly.

9.0 INTEGRATING ENVIRONMENTAL JUSTICE INTO THE CENTER'S NEPA PROCESS FOR FUTURE ACTIVITIES AND PROGRAMS

9.1 Introduction

The National Environmental Policy Act (NEPA) establishes the Nation’s broad environmental protection policy. NEPA sets goals for protecting and enhancing environmental quality and authorizes action-forcing provisions to ensure compliance by Federal agencies. NEPA requires that Federal agencies consider environmental values when planning actions that may have an impact on the human environment. Agencies must analyze and consider alternatives to proposed actions and make this information available to the public and other Federal, state, and local entities.

At GRC, sponsors proposing projects with potential environmental impacts submit an Environmental Analysis Checklist to the EMO for review. Sponsors indicate if the proposed action would have any environmental effects (including human health, social, and economic) on minority or low-income populations. Environmental analyses may undergo different levels of review within EMO. Projects with minor or no impact or those that qualify for a categorical exclusion receive a Record of Environmental Consideration. Projects of modest scope, severity, or cost are given an analysis called an Environmental Assessment (EA). EAs are released to the public and government agencies for review and comment prior to initiation of the proposed action. Projects with the potential for significant impacts to human health or the environment undergo a thorough analysis documented in an Environmental Impact Statement (EIS). Due to the research nature of the work performed at Lewis Field, preparation of an EIS for a proposed action has never been necessary. GRC served as a cooperating agency in the Federal Aviation Administration’s production of a Final Environmental Impact Statement (FEIS, June 2000) for the Cleveland Hopkins International Airport Expansion Project. Environmental justice was specifically addressed in the NEPA analysis and in the public outreach programs.

The EMO performs the primary functions of the NEPA process such as evaluating proposed activities; developing, reviewing and approving required documentation; advising project managers; and signing environmental decision documents on minor projects and programs, especially those having little or no environmental impact.

Projects proposed for the PBS are formally reviewed by the NEPA Program Manager at Lewis Field who develops and approves the NEPA documentation.

9.2 Program Status

The NEPA program at Glenn has received acceptable ratings for thoroughness and compliance from both internal and external auditing organizations. Issues related to environmental justice are considered at every level of NEPA analysis. Records of Environmental Consideration (RECs), EAs, and EISs contain mandatory analyses of potential impacts of the proposed action on minority or low-income populations.

To keep NEPA documentation current and compliant, Glenn recently completed an update of its *Environmental Resources Document* (SAIC 2003). The ERD contains references to the *EJIP*.

9.3 Opportunities for Enhancing Environmental Justice

All future RECs, EAs and EISs under the Center's control will continue to integrate environmental justice considerations into the center's NEPA process.

9.4 Implementing the Plan

The plan to integrate environmental justice considerations into the center's NEPA process has been implemented.

10.0 COMMUNICATING IDENTIFIED PROBLEM AREAS TO AFFECTED COMMUNITIES

The NASA Form C-150 is the Environmental Analysis Checklist. It requires project managers to inform the EMO if a proposed project has any environmental effects on minority or low income communities, including human health, social, and economic effects. The form also requires documentation of any planned measures to prevent pollution (recycling or reuse) and any alternatives considered, including no action. This documentation forces GRC to consider actions which reduce or eliminate adverse effects.

GRC has no ongoing significant offsite impacts. There are, therefore, no ongoing dialogues with neighboring communities to discuss these issues. Projects with the potential for significant offsite environmental impacts are addressed on a case-by-case basis.

Advanced NEPA analyses such as EAs and EISs require even more detailed impact analyses, public involvement, and consideration of alternative actions. As with the preparation of the EA *Decommissioning of the Plum Brook Reactor Facility* (March 2001), a Community Relations Plan would be prepared to address mechanisms for informing and involving the public in activities and decisions, and identify community questions, concerns and information needs regarding the project, and preferences for communication.

Methods of informing and involving the public would typically include news releases, public service announcements, media opportunities, direct mailings, exhibits, a dedicated Website for the project, open houses, a 24-hour toll-free Information Line, and community information sessions.

11.0 ASSESSMENT OF EMERGENCY RESPONSE PLANS FOR ENVIRONMENTAL JUSTICE ADEQUACY

11.1 Introduction

The Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 in response to growing concern about the possible effects of chemical releases on communities. EPCRA supports emergency planning efforts at the state and local level and provides citizens and local governments with information about potential chemical hazards in their communities.

11.2 Program Status

EPCRA and EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention requirements direct Federal agencies to provide technical assistance to the Local Emergency Planning Committee (LEPC) in the development of emergency response plans and the fulfillment of community right-to-know responsibilities, if requested and to the extent practical. GRC has responded to all requests for information from the State and Cuyahoga County LEPC. The GRC *Emergency Preparedness Plan* (2003) was developed under the EPA guidelines as well as OSHA guidelines and consolidates the pollution incident prevention and emergency response programs at GRC. GRC has also supplied the LEPC with a list of resources and equipment which can be made available in the event of an emergency.

EPCRA requires the owner or operator of facilities with hazardous chemicals regulated under the Occupational Safety and Health Act (OSHA) to submit an emergency and hazardous chemical inventory to the State EPA, State Emergency Response Commission, the LEPC, and the local fire department with jurisdiction over the facility. The GRC EMO is responsible for submitting the Emergency and Hazardous Chemical Inventory Forms. The EMO is also responsible for submitting the EPA Toxic Release Inventory Form (Form R) to USEPA Region 5 and Ohio EPA. GRC is substantially in compliance with EPCRA and EO 12856.

11.3 Lewis Field

Fire, medical, and hazardous material emergency response are provided at Lewis Field by the adjacent communities of Cleveland, Brook Park, and Fairview Park. Under the current plan, reported incidents are first investigated by onsite first responders. If deemed necessary, NASA dispatchers call for outside assistance. In an obvious emergency, outside assistance is requested immediately. There is also coordination of emergency services with the City of Brook Park Fire Department and Hazardous Materials Response Team.

11.4 Plum Brook Station

At Plum Brook Station health, emergency, and fire services are provided by Perkins Township under an informal cooperative agreement. This may be formalized in the future in a written agreement. The PBS *Emergency Preparedness Plan* is current. There are no plans to update it in the near future.

PBS has a Spill Prevention, Control, and Countermeasure Plan (2002). The Plan describes procedures for the prevention and control of oil spills, including PCB-containing oil spills, and specifies program responsibilities, training, spill reporting, location of response equipment, and emergency response procedures.

11.5 Opportunities for Enhancing Environmental Justice

GRC has considered incorporating environmental justice elements into emergency response plans by evaluating: (1) cultural and language differences of minority and low-income populations, and (2) changes in transportation routes that could lessen disproportionate impacts to minority and low-income populations. This Plan assumes a 5-mile region of potential influence for evaluating Lewis Field and Plum Brook Station facilities. There are no significant concentrations of non-English speaking people within these boundaries. Because GRC has minimal direct environmental impacts beyond these distances, cultural and language differences are currently not environmental justice issues affecting GRC.

GRC is responsible for procuring and shipping hazardous materials. Should an incident involving the accidental release of such materials occur within Cuyahoga County, the Cuyahoga Emergency Communications (CECOMS) staff would be responsible for managing the incident response and community relations support. At Plum Brook Station, the comparable entity is the Erie County Emergency Management Agency. In both cases, the fire chief for the area would have access to an interpreter if language differences impacted emergency communications.

Employees at GRC that transport hazardous materials receive HazMat training, which includes spill response procedures.

Transportation routes for hazardous materials are selected by the Public Utilities Commission of Ohio based on population density and risk assessment, among other factors. Neither Glenn nor PBS is actively involved in selecting the transportation routes for hazardous material shipments. It is highly unlikely that GRC would be responsible for hazardous material shipments with disproportionate impacts to minority and low-income populations.

11.5 Implementing the Plan

Implementation of the GRC Emergency Response Plan will support environmental justice by reducing the possibility that adverse environmental and human health impacts will occur in the event of an emergency.

12.0 METRICS FOR ATTAINING ENVIRONMENTAL JUSTICE REQUIREMENTS

12.1 Environmental Justice Metrics

The following identifies elements for measuring progress toward either attaining or maintaining environmental justice objectives. Emphasis is on those areas that the Center can control directly.

The success of the community involvement program with regards to environmental justice will be measured by the extent of criticisms of GRC environmental impacts received from minority or low-income populations.

The CMRO will be responsible for reporting identified complaints and issues relating to environmental justice to the EMO. The Environmental Justice Coordinator will make a determination as to whether a

complaint is valid and will take action as appropriate.

The potential for adverse human health or environmental impacts decreases as emissions, releases, or disposal of hazardous materials is reduced or eliminated. The success of the GRC Pollution Prevention Program as it relates to impacts on minority and low-income populations will be measured by:

- Periodic audits to confirm the most environmentally preferred chemical alternatives are in use and in stock
- The percentage of the GRC vehicle fleet using alternative fuels and compatible fuel substitutes
- The percentage of recyclable materials being recycled
- The reduction in electrical use due to energy conservation measures or alternative energy source use.

The effectiveness of GRC's environmental compliance program in maintaining environmental justice will be measured by:

- The number and frequency of environmental regulatory violations
- The number and significance of deficiencies reported in compliance audits.

With respect to environmental justice, the metric GRC's of emergency response program will be the Center's success in mitigating offsite impacts due to emergencies.

The success of the NEPA program in addressing Environmental Justice concerns will be measured by the percentage of NEPA documents that receive no critical comments with regard to environmental justice issues. The CMRO will be responsible for reporting identified complaints and issues relating to environmental justice to the EMO. The Environmental Justice Coordinator will make a determination as to whether a complaint is valid and will take action as appropriate. Should the Center receive valid criticism of its consideration of environmental justice, the NEPA process will be reevaluated to determine if new procedures could avoid recurrence of the criticism.

Current activities at GRC to raise the awareness level of GRC in surrounding minority and low-income communities include the activities listed in Section 8.0, Public Involvement in Environmental Justice Issues.

12.2 Benefits to the target populations due to NASA's EJ and other initiatives.

There are several outreach programs in which GRC is involved, thus furthering GRC's commitment to the community. These programs also involve outreach to GRC employees and contractors. Such programs include:

1) participating in the Summer High School Research Apprentice Program (SHARP)- this program is designed to encourage academically gifted and under-represented minority students to explore professions related to science, mathematics and engineering;
2) participating in the Combined Federal Campaign (CFC);
3) operating a teacher-resource center where local people can obtain material on science, math and related topics and providing extensive information about NASA and GRC on the Internet;
4) participating in the Annual EarthFest;
5) participating in Take-Your-Children To Work day;
6) participating in African-American Heritage Month;

7) participating in Hispanic Heritage Month;
8) participating in Asian Pacific Islanders Heritage Month;
8) participating in Native American Heritage Month; and,
9) grant to Esperanza, a non-profit Hispanic organization focused on education;
10) grant to the Viva Technology program of the Hispanic Engineer National Achievement Awards Conference (HENAAC).

REFERENCES

ENVIRONMENTAL JUSTICE: Guidance under the National Environmental Policy Act, Council on Environmental Quality, December 1997.

Environmental Justice Implementation Plan for NASA Lewis Research Center, Jones Technologies, Inc., April 1996.

Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," signed on, and effective as of, August 3, 1993.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," signed on, and effective as of, February 11, 1994.

Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses, U.S. Environmental Protection Agency, April 1998.

Guidance For Federal Agencies On Key Terms In Executive Order 12898, U.S. Environmental Protection Agency, August 1995.

National Aeronautics and Space Administration's Environmental Justice Strategy, No Date.

NASA Glenn Research Center, Environmental Spill and Contingency Plan, SAIC, October 2003.

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